Comments regarding

Dietary Guidelines for Americans

Submitted to the
Dietary Guidelines Advisory Committee,
U.S. Department of Health and Human Services, and
U.S. Department of Agriculture

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The Center for Science in the Public Interest (CSPI) respectfully submits to the Dietary Guidelines Advisory Committee (DGAC), the U.S. Department of Health and Human Services (DHHS), and the U.S. Department of Agriculture (USDA) recommendations regarding the bulletin *Nutrition and Health: Dietary Guidelines for Americans.*

CSPI is a non-profit consumer education and advocacy organization that since 1971 has been working to improve the public's health through better nutrition and safer food. CSPI's work is supported primarily by its 800,000 members and subscribers to its *Nutrition Action Healthletter*, the nation's largest circulation health newsletter. CSPI does not accept any government or corporate funding.

CSPI's work was instrumental in passage of the Nutrition Labeling and Education Act of 1990 and the Alcoholic Beverage Labeling Act of 1988. Other initiatives include studies of the nutritional quality of restaurant foods, advocating trans fat labeling on packaged foods, and campaigns to promote low-fat milk consumption, improve school foods, stop misleading food and alcohol advertising, enforce food safety laws, and improve alcoholic-beverage labeling.

Enclosed are eight sets of comments regarding the following guidelines:

- Nutrient Adequacy
- Sodium
- Fibers
- Whole Grains
- Added Sugars
- Energy Balance
- Fatty Acids
- Restaurant Foods
- Food Dyes and Behavior
- Ethanol

Our comments are summarized in the oral testimony which will be presented to the committee on January 29, 2009, which is enclosed.

For more information or questions regarding these comments please contact Alexandra Lewin, Ph.D. at 202.777.8351 or alewin@cspinet.org.

Comments by the Center for Science in the Public Interest on Fibers

I. Advise consumers to look for the intact fiber in grains, not isolated fibers added to foods.

The 2005 Guidelines states that "the recommended dietary fiber intake is 14 grams per 1,000 calories consumed," and notes that "consuming at least half the recommended grain servings as whole grains is important, for all ages, at each calorie level, to meet the fiber recommendation." In a separate advice for older adults, the Guidelines notes that "dietary fiber is important for laxation. Since constipation may affect up to 20 percent of people over 65 years of age, older adults should choose to consume foods rich in dietary fiber."

The 2010 Dietary Guidelines needs to distinguish more clearly between whole grains, beans, vegetables, and fruits with intact fiber versus foods with added isolated fibers. In recent years, companies have started adding isolated fibers—mostly purified powders—to foods that have always been fiber-free (ice creams, yogurts, juices, drinks) and to foods that always contained naturally occurring fiber (cereals, breads, pasta). See Attachment: "Fiber Free-for-All: Not All Fibers are Created Equal," NAH July/August, 2008.

However, there is little or no evidence that isolated fibers, including inulin, polydextrose, resistant maltodextrin, oat fiber, and soy fiber—have the same benefits as intact fiber. None have been linked to a lower risk of heart disease or diabetes, and none have consistently lowered blood cholesterol or blood sugar. It is not clear whether—and to what extent—polydextrose, oat fiber, and soy fiber may promote laxation. However, inulin and maltodextrin appear to have little or no effect, and both polydextrose and inulin appear to cause gas, bloating, or other gastrointestinal discomfort.33 Overall, few well-designed studies have documented the effects of most isolated fibers on any key outcome.

Unfortunately, Nutrition Facts labels do not distinguish between intact and added isolated fibers. Careful consumers can study the ingredient label to see if a food contains any added fiber. However, even those wary consumers cannot tell how much of a food's fiber is intact and how much is isolated.

(Note: The Institute of Medicine used the term "functional fiber" instead of "isolated fiber" and "dietary fiber" instead of "intact fiber." 34 However, the report stated that a fiber would have to have beneficial physiological effects in humans to qualify as "functional." Despite the absence of evidence for those benefits, isolated fibers are now listed as "dietary fiber" on Nutrition Facts labels.)

Industry analysts predict that a new fiber craze is in progress.35 (See Attachment, "Fiber

Being Pitched As Tasty, Sexy Even.") Given the growing prevalence of foods to which isolated fiber is added, it is critical that the Dietary Guidelines warn consumers that the isolated fibers added to foods may have few health benefits, and that they should rely on whole grains, beans, vegetables, and other sources of intact fiber instead.

Comments by the Center for Science in the Public Interest on Whole Grains

I. Delete the advice to consume at least 3 ounce-equivalents of whole grains per day.

The current Guidelines urges consumers to "consume 3 or more ounce-equivalents of whole-grain products per day, with the rest of the recommended grains coming from enriched or whole-grain products. In general, at least half the grains should come from whole grains." This "key recommendation," which also appears in both the "Food Groups to Encourage" and the "Carbohydrates" chapters, has led to enormous confusion and deception in the marketplace.

The food industry has translated the 3-ounce advice into an 8-gram minimum.

The food industry has distorted the recommendation to "consume 3 ounces or more of whole grain products." The industry has argued that the Guidelines recommend three 16-gram servings, or 48 grams, of whole grains per day as a daily target, much like the Daily Values for vitamins and minerals. Using 48 grams as a daily target, the industry has argued that any food with at least 8 grams of whole grains is a "good source" and any food with at least 16 grams of whole grain is an "excellent source." In 2005, the FDA issued a draft guidance that denied an industry petition to make "good source" and "excellent source" claims for whole grains. However, some companies have continued to use the 8-gram criterion as a minimum for "made with whole grain" and similar claims.

A food with 8 grams of whole grain could be 85% or more *refined* grain.

Any claims that use 8 grams (or any other minimum absolute quantity) of whole grains as a criterion are deceptive because they ignore the second part of the Guidelines' advice, which is to make at least half of one's grains whole. For example, if a breakfast cereal with a 55-gram serving size contains 8 grams of whole grains, it could be only 15 percent whole grain and as much as 85 percent refined grain. That cereal could be labeled "made with whole grains," and possibly "good source of whole grains," yet it would contradict the advice to "make half your grains whole." (For additional examples, see Attachment: "Whole Grains: The Inside Story," NAH, May 2006).

The 3-ounce advice could lead consumers to get far more refined than whole grains.

Consumers who diligently strive to consume 3 servings of foods that are "made with whole grains" may end up with only 24 grams of whole grains along with a far greater quantity of refined grains. (For example, if a consumer ate three 55-gram servings of a cereal that contains 8 grams of whole grain, 35 grams of refined grain, 12 grams of sugar per serving, he or she would consume 105 grams of refined grains and 36 grams of sugar, along with the 24 grams of whole grains.) What's more, labels do not disclose levels of

refined grains, so consumers who eat those 3 foods would not know that they have failed to follow experts' advice on whole grains.

Ideally, the FDA would remedy this confusion by requiring:

- all grain foods to bear a "__% whole grain" disclosure above the Nutrition Facts panel. (This disclosure would appear in the same location as the "__% juice" disclosure on juice drinks, ades, and similar beverages.)

- all foods that make a whole grain claim to bear a "__% whole grain" disclosure next to the claim.

The "3 ounce-equivalents" advice is confusing.

The Guidelines recommends consuming "at least 3 or more ounce-equivalents of whole grains." Most people have no idea what an "ounce-equivalent" is. Consumers can't assume that it's equal to one serving of breakfast cereal because a single serving typically weighs either one ounce or two ounces. Nor can consumers assume that a slice of bread is an "ounce-equivalent," since a single slice of many breads weighs roughly 1½ ounces and many bagels weigh up to 4 ounces. More importantly, few consumers go to the trouble of checking serving sizes to see how many ounce-equivalents they contain (that is, if they had any idea what an ounce-equivalent is). Finally, people who are intimidated by jargon like "ounce-equivalents" will ignore the advice altogether.

II. Urge consumers to eat foods that are "100% whole grain," or at least "50% whole grain."

The Guidelines could stick with a simple, clear message to "Make at least half of your grains whole grains." In addition, the Guidelines could offer the following advice to consumers:

Look for foods that that are "100% whole grain," or at least "50% whole grain."

The simplest advice for people who seek whole grains is to "look for a 100% whole grain claim on the label." Any food that's at least 50% whole grain can also help people follow the Guidelines (though higher percentages of whole grain would be preferable). Only a few foods, such as Barilla pasta, carry an "X% whole grain" claim on the label (see Attachment:"The Whole Truth," NAH, June, 2008). However, percentage claims could become more widespread if the Guidelines were to advise people to seek them.

Ignore vague claims such as "made with whole grains."

Many consumers do not understand that "made with whole grains" means "*only partially* made with whole grains" or (in many cases) "made with *very little* whole grain." To many people, "made with whole grains" means "made *only* with whole grains." If the

Guidelines was to urge people to ignore deceptive "made with whole grains" claims, the food industry might use them less often.

Ignore claims that disclose the number of grams of whole grains.

Many labels carry claims such as "8 grams of whole grains." These claims are often misleading because the food may contain a far greater—but undisclosed—quantity of refined grains. Perhaps some dietitians and sophisticated consumers may know that they have to check the weight of a serving and calculate what percent is whole grain. However, that calculation is usually imprecise because the label doesn't disclose the levels of moisture or other constituents that contribute to a food's weight. A frozen pizza that contains, say, 10 grams of whole grain may weigh 130 grams, but much of the weight comes from tomato sauce, cheese, and moisture. Therefore, it is easier for consumers to ignore claims that disclose the number of grams of whole grains and instead rely on claims that disclose the "__% whole grain." In any case, consumers shouldn't be forced to make such calculations.

Don't confuse whole grains with high-fiber foods.

Many people assume that whole grains and fiber are equivalent, and many foods are now carrying fiber claims. However, those foods often reach a high fiber level because they contain added isolated fibers, such as inulin, polydextrose, resistant maltodextrin, and oat fiber (see NAH, July/Aug, 2008). Studies have not demonstrated that those fibers lower the risk of heart disease, constipation, or other health problems. The Guidelines could clarify some of this confusion by reminding consumers that a high-fiber food may not be whole grain.

Delete or clarify the reference to health claims.

The Guidelines now advises consumers that "the Food and Drug Administration requires foods that bear the whole-grain health claim to (1) contain 51 percent or more whole-grain ingredients by weight per reference amount and (2) be low in fat." The Guidelines should either delete the reference to "the whole-grain health claim" or replace it with a reference to the precise claim:

> Diets rich in whole grain foods and low in total fat, saturated fat, and cholesterol, may help reduce the risk of heart disease and certain cancers.

Without that clarification, few consumers know which claims are "health claims." Some may assume that claims like "made with whole grains" or "heart healthy" are also health claims.

Comments by the Center for Science in the Public Interest on Added Sugars

I. Urge consumers to limit added sugars to 6% to 10% of calories.

We urge the Committee to review carefully the evidence on appropriate dietary levels of added sugars (especially sucrose, which contains fructose), high-fructose corn syrup (HFCS) (which contains fructose and is treated by the body much like sucrose), and fructose). Furthermore, we urge the Committee to make a more explicit recommendation concerning the appropriate amount to consume than was made in the 2005 edition of the Dietary Guidelines for Americans. That edition's recommendations were provided in an appendix instead of appearing in the main body of text.

Numerous health authorities have urged consumers to limit added or ("free" or "extrinsic") sugars to 6% to 10% of calories.

The issue of how much added sugars are appropriate in a diet has been widely debated by nutrition and health experts in the United States and around the world. They have come to a close consensus.

- The U.S. Department of Agriculture's pamphlet entitled "The Food Guide Pyramid"36 has long recommended that people consuming 1,600 calories per day should not consume more than 6 teaspoons of added sugars, and people consuming 2,200 calories per day should not consume more than 12 teaspoons of added sugars. Interpolating those numbers indicates a limit of 10 teaspoons (40 grams) per day of added sugars in a 2,000-calorie diet. That amounts to 160 calories or 8% of energy, with slightly lower or slightly higher percentages for diets of lower or higher caloric content.

- In 2003, the World Health Organization recommended a limit of less than 10% of energy in the form of "free" sugars (or "extrinsic" sugars, which includes the sugars in fruit juice).37

- The 2005 Dietary Guidelines for Americans recommends limits for added sugars when the fat intake of a healthy diet (all the recommended servings of the lowest-fat versions of foods from the different food groups) is capped at 27% to 30% of calories.38 For a 2,000-calorie diet, the Guidelines recommends a limit of 32 grams, or 6.4% of calories. Note that that approach to identifying a sugar limit does not rely on identifying a harm associated with sugar, but is based on how many discretionary calories fit into a healthy diet without exceeding calorie recommendations and then assigning some to fats and some to added sugars (consuming some of the calories in the form of alcohol would of necessity decrease the amount of fat or added sugars that would be permitted).

The 32-gram limit recommended in the Dietary Guidelines suggests that the public be advised in the strongest terms to limit soft drink intake. Non-diet soft drinks typically contain 40 grams of refined sugars (typically high-fructose corn syrup) in a 12-ounce can and 67 grams in a 20-ounce bottle.

Recommending a limit of 6% to10% of calories from added sugars would be consistent with previous recommendations by USDA, WHO, the Dietary Guidelines, and others.

<u>The IOM did not recommend diets with up to 25% of calories from added sugars.</u>

Food industry representatives often cite an Institute of Medicine report to establish that diets obtaining up to 25% of calories from added sugars are safe and appropriate. In 2002, the Institute of Medicine (IOM) "suggested" a maximal intake of 25% of calories as added sugars because larger amounts clearly reduce intake of essential nutrients. However, the IOM did not "recommend" a daily intake for added sugars based on that or other effects (effects on blood lipids, dental caries, etc.) of added sugars. Nor did the IOM consider the food environment from which sugars are obtained. (There is evidence that calories consumed in the form of liquids, such as soft drinks, are more conducive to obesity than calories obtained from solid foods). In a follow-up letter39 to the Department of Health and Human Services, the president of the IOM, Harvey Fineberg, explained:

> This language is not meant to convey a desirable or even acceptable standard intake. The report states that persons whose intake of added sugars is 25% or more of total calories are more likely to have poorer intakes of important essential nutrients. It does not address the issue that added sugar intakes at 25% or even well below it, may well have significant imp1ications for caloric
> balance and weight control. Interpretations suggesting that a sugar intake of 25% of total calories is endorsed by the Institute's report are incorrect.
>
> It is our intent to clarify the language in the report to address this point before it is published in final text. However, I wish to clarify the report's findings immediately so that the mischaracterization of the findings is not misleading to the public or to policy-makers.

Furthermore, even if the IOM had recommended a limit based just on nutrient dilution from sugar-containing foods, it would certainly be appropriate to include a safety factor to protect people whose diets were significantly adversely affected by added sugars. Toxicologists customarily use 10-fold safety factors below the highest no-effect level of a substance. While that would be too stringent for this situation, a safety factor of two or three would certainly be appropriate.

II. Clarify the differences and similarities between sucrose, HFCS, glucose, and fructose.

<u>Advise the public that HFCS is no more harmful than sucrose.</u>

We suggest that the DGAC comment on the health impacts of *different* sugars. Some

academics, journalists, and activists have contended that HFCS is more harmful than sucrose. To our knowledge, there are no data supporting the contention that, nutritionally, HFCS affects the body any differently from sucrose.[40,41,42,43] Indeed, when sucrose is used to sweeten soft drinks, the acids in the drinks split sucrose into equal amounts of its two component sugars, glucose and fructose. The same two sugars comprise the bulk of HFCS.[44] A statement by the Committee on the equal harmfulness of HFCS and sucrose could help put an end to this unnecessary debate that only confuses the public's understanding of nutrition.

Advise the public that the fructose in both sucrose and HFCS may promote weight gain and heart disease.

The DGAC should consider and comment on differences in safety between glucose and fructose. Those molecules are metabolized in very different ways and have very different effects on blood sugar, insulin secretion, fatty acids and triglycerides, and levels of hormones, such as leptin and ghrelin, that influence body weight (see references in previous paragraph). The DGAC could conclude that a "total sugars" limit should apply to HFCS and sucrose, but that people make a special effort to cut back further on added fructose[45] and be somewhat less concerned about added glucose and corn syrup.

III. Urge consumers to severely limit added sugars from beverages, particularly soft drinks.

We urge the DGAC to recommend in strong language that people consume few or no carbonated and non-carbonated soft drinks, including fruit drinks, energy drinks, and sports drinks. Furthermore, because of the major impact of added sugars and soft drinks on health, we urge the DGAC to encourage the FDA to set a Daily Value (DV) for refined sugars, listing refined sugars and the percent DV on Nutrition Facts labels. The DGAC also should recommend that a series of rotating warning labels be required on non-diet soft drinks.[46]

Soft drinks promote obesity.

The consumption of soft drinks has soared in recent decades, in parallel with the obesity epidemic. Researchers have conducted cross-sectional, cohort, and intervention studies of soft drinks and obesity (and other health outcomes) because such drinks are so widely consumed in large quantities and typically provide little nutrition other than calories. Many studies have found an association between the drinks and weight gain. In fact, soft drinks are the *only* beverages or foods that have been directly linked to obesity.

It is only in the last 10 or 15 years that researchers have begun to find statistical and experimental evidence that soft drinks do, in fact, promote obesity.

- An analysis of USDA's 1994–1996 dietary-intake data found that obesity rates have risen in tandem with soft-drink consumption and that heavy consumers of soda pop have higher calorie intakes.[47]

- A study of middle-school children in Santa Barbara County, California found a strong association between obesity and consumption of both regular and diet soft drinks.48 (The link between diet soda and obesity may reflect that some overweight children have made dietary changes or that children may consume excess snack foods along with the sodas.)

- National Cancer Institute scientists found that soft drinks provide a larger percentage of calories to overweight youths than to other youths. The difference was most striking among teenage boys: Soft drinks provided 10.3 percent of the calories consumed by overweight boys, but only 7.6 percent of the calories consumed by other boys. Those findings suggest that soft drinks contribute to obesity, even though in this study no difference was observed in the overall caloric intake of the two groups.49

- A 19-month observational study on the relationship between soft-drinks and obesity in children involved 548 children whose average age was just under 12 years.50 It found that the chances of becoming obese increased significantly with each additional daily serving of sugar-sweetened drink. It also found that at the beginning of the study children's consumption of sugar-sweetened drinks was associated with increased BMI. Though the study was relatively small (37 children became obese over the course of 19 months), it adds to the evidence that soft drinks are contributing to the obesity epidemic.

- A much larger observational study, the Growing Up Today Study, involved more than 12,000 children between 9 and 14 years old and found that greater consumption of soft drinks was associated with small increases in BMI over a two-year period.51,52 The authors concluded that "consumption of sugar-added beverages may contribute to weight gain among adolescents, probably due to their contribution to total energy intake."

- That soft drinks contribute to obesity in adults, not just children, was indicated by a study of tens of thousands of nurses over an eight-year period.53 Women who increased their consumption of soft drinks from less than one a week to one or more per day gained an average of 18 pounds. Women who originally drank one or more soft drinks per day but then cut back to no more than one drink per week gained the least weight (about six pounds). That study also found that women who drank soft drinks daily had almost twice the risk of type 2 diabetes as women who drank little or no soda pop. Fruit drinks also promoted weight gain and diabetes.

  In an accompanying editorial, a researcher at the Boston University School of Medicine commented that the study "provides strong, scientifically sound evidence that excess calories from soft drinks are directly contributing to the epidemics of obesity and type 2 diabetes" and that "reducing sugar-sweetened beverage consumption may be the best single opportunity to curb the obesity

epidemic."54

- Consumption of non-diet soft drinks and non-diet fruit "drinks" was positively associated with weight in a cohort of almost 50,000 African American women.55 Women who increased their consumption of those beverages over the observation period gained more weight than women who decreased their consumption. Also, a smaller percentage of women who consumed those beverages lost weight.

- Intervention studies can identify cause-and-effect relationships with greater certainty than observational studies like the ones discussed above. One such study involved 644 students between 7 and 11 years old in 29 school classes in England. The researchers studied the effect of strongly encouraging the children in half the classes to drink less "fizzy" drinks.56 After one year, the percentage of overweight and obese children in the test group remained the same, but increased by 7.5 percent in the control group.

- Another intervention study, this one in Denmark, compared the health effects of sugar-sweetened and diet soft drinks.57 For ten weeks, overweight adults consumed, among other foods, either 600 calories' worth of beverages and foods sweetened with sugar or similar foods prepared with artificial sweeteners. The group that ate the sugar-sweetened beverages and foods gained an average of 3.5 pounds, while those who consumed the artificially sweetened products lost an average of 2 pounds.

- A 25-week intervention study provided free non-caloric beverages to displace sugar-sweetened beverages in the homes of adolescents.58 That simple intervention almost completely eliminated consumption of caloric soft drinks and significantly decreased calorie intake. Among the subjects in the upper baseline-BMI (body-mass index) tertile, BMI change differed significantly between the intervention and control groups.

- A 2006 systematic review of studies on sweetened beverages and weight loss found a strong relationship.59 Those researchers stated: "[F]indings from several large cross-sectional investigations, well-powered prospective cohort studies with long follow-up and repeated measures of diet and weight, a school-based intervention targeting soda consumption, and an RCT assessing the effect of reducing sweetened beverage consumption have provided strong evidence for the independent role of the intake of sugar-sweetened beverages, particularly soda, in the promotion of weight gain and obesity in children and adolescents."

- Another review and meta-analysis found "7 studies that examined the connection between soft drink intake and body weight in an experimental or intervention context. Five reported a positive association."60 The researchers expressed

surprise "that a single source of energy can have such a substantial impact on total energy intake. This finding alone suggests that it would be prudent to recommend population decreases in soft drink consumption."

- A longitudinal study of more than 3,000 black and white girls monitored beverage consumption between the ages of 9.5 and 18.661 found that "Of all beverages, increasing soda consumption predicted the greatest increase of BMI and the lowest increase in calcium intake." Fruit drinks, which are essentially non-carbonated sodas, showed similar, but not statistically significant associations with obesity and calcium intake.

  In commenting on the Striegel-Moore study, William Dietz, the director of the Division of Nutrition and Physical Activity of the Centers for Disease Control and Prevention, recommended "changing the environment" to promote healthier beverage choices.62 As CSPI has recommended earlier, the FDA should (a) designate a DV for added sugars and require that the percentage of that DV be listed on Nutrition Facts labels (changing "sugars" to "added sugars") and (b) require a series of rotating warning notices on labels of carbonated and non-carbonated non-diet soft drinks.

- A 2007 Joint FAO/WHO committee reviewed studies on sugar-sweetened beverages and weight and concluded: "evidence from short-term blinded randomized controlled trials, medium-term non-blinded randomized trials, and long-term prospective cohort studies indicates that reduction of consumption of sugar-sweetened beverages is beneficial for weight management."63

  The FAO/WHO committee as a whole affirmed, "Thus, there is justification for the recommendation to restrict the consumption of beverages high in free sugars to reduce the risk of excessive weight gain….Thus, the outcomes of the Scientific Update support the population nutrient intake goals on free sugars (that is, <10% of total energy) that were recommended by the 2002 WHO/FAO Expert Consultation."64

The fear that soft drinks are fueling the epidemic of overweight and obesity was echoed by the Institute of Medicine's Committee on Prevention of Obesity in Children and Youth.65 It acknowledged the lack of "definitive proof" that soft drinks cause obesity, but still declared:

> Because of concerns about excessive consumption of sweetened beverages in place of more nutrient-rich or lower-calorie alternatives, children should be encouraged to avoid high-calorie, nutrient-poor beverages.

One reason that soft drinks appear to be conducive to obesity is that calories consumed in the form of liquids, rather than solids, are more likely to promote obesity. In one study, subjects added 450 calories a day to their diets from either soft drinks or jelly beans during two four-week periods.66 When they ate jelly beans, the subjects compensated for the added calories by consuming roughly 450 fewer calories from other foods.

However, when they drank soft drinks, the subjects failed to compensate, adding 450 calories to their previous diet. Other studies support that finding,67 but some research does not.68 The differing results may be due to the foods tested, the subjects tested, the length of the tests, or other reasons. (Though few studies have compared the effects of different liquids on weight gain, two small clinical studies did not find any difference in caloric intake at lunches that were either preceded or accompanied by drinking equal numbers of calories in the form of cola, orange juice, or low-fat milk.69 However, such clinical studies have not evaluated whether the drinking of particular beverages, because of their customary roles in the diet, conventional serving sizes, or tastes, affects how much of those beverages one drinks and what solid foods one eats.) Meanwhile, prudence would suggest that we pay heed to the possibility that liquid calories are particularly conducive to weight gain.

Heavy soft drink consumption causes health effects other than obesity.

Research also has linked soft drink consumption to **metabolic syndrome**, which is associated with an increased risk of coronary heart disease. An eight-year-long longitudinal study of 154 girls70 concluded that "The only significant [dietary] difference" among the several risk groups "was in sweetened beverage intake." A study of young adults (19 to 38 years old) in Louisiana found a strong association between consumption of sweetened beverages and risk factors for metabolic syndrome.[71] That finding, according to the researchers, was not simply due to the subjects consuming excess calories or being overweight.

Similarly, the Framingham Heart Study has evaluated associations between soft-drink consumption and metabolic syndrome in middle-aged adults.72 At the beginning of the study, frequent consumers of soft drinks had a higher incidence of metabolic syndrome, diabetes, dyslipidemias, and other adverse health parameters. After four years, consuming one or more soft drinks per day was associated with statistically significant increases in metabolic syndrome, obesity, greater waistline, and dyslipidemias.

Diabetes has been associated with consumption of non-diet soft drinks and non-diet fruit "drinks" in a cohort of 50,000 African American women.73 Consuming two or more soft drinks per day was associated with a 24 percent chance of developing diabetes compared to women who drank less than one drink per day.

Because over-consumption of sugar and soft drinks increases the risk of diabetes, the American Diabetes Association in 2008 advised the FDA that:

> Foods high in added sugars (such as soda and sweets) are nutritionally inferior to foods high in naturally occurring sugar (such as fruit and milk)…. ADA suggests establishing a Daily Reference Value for **added** sugars to help guide consumers in choosing the most nutrient dense carbohydrate-containing foods. It would also be deemed acceptable to list only "added sugars" in place of "sugars" on the label. Adding information on "added sugars" will assist consumers in following the guidance of the USDA Food Guide as well as the US Dietary Guidelines.74

Additional research indicates that high cola consumption is associated with **lower bone density** in women[75] and **chronic kidney disease**[76] and that consumption of any soft drinks is associated with a higher risk of **gout.**[77,78]

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